

## BOSCH

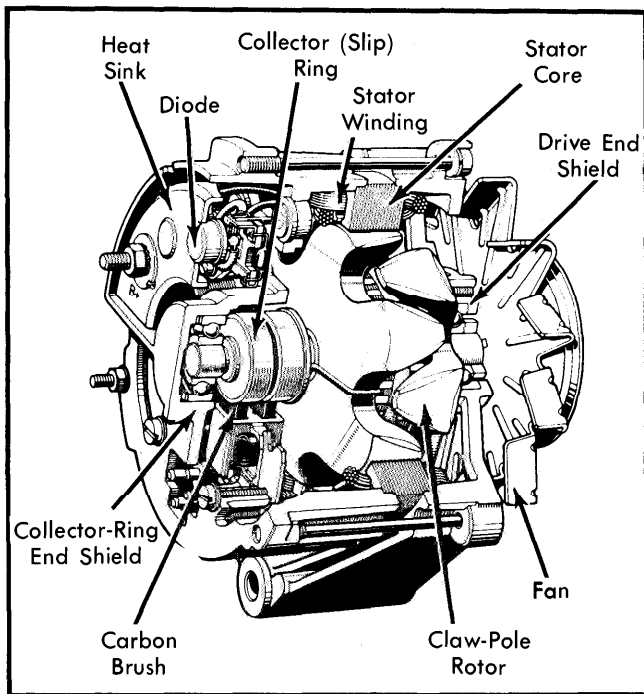
### American Motors Eagle

#### DESCRIPTION

Bosch type K1 alternator, used only on Eagle models with heated rear window and fog lights, features a solid-state regulator which mounts on the rear end of the alternator and includes an integral brush holder and brush assembly.

The 65 ampere alternator consists primarily of front and rear housings, stationary stator windings, rotating field windings (rotor), and rectifying diodes.

The rotor is supported in the drive end housing and slip ring housing by ball bearings. Bearings contain enough lubricant to eliminate the need for periodic lubrication.



**Fig. 1 View Showing Internal Components of Bosch K1 Alternator**

#### OPERATION

Current is passed to the rotating field through slip rings and 2 brushes integral with the voltage regulator mounted on the rear housing. Stator windings are assembled on the inside of a laminated core that forms part of the alternator frame. A diode plate connected to the stator windings contain 6 diodes (3 positive and 3 negative) soldered to the stator windings. Diode plate assembly changes the stator AC voltage to DC voltage. Blocking action of diodes also prevents battery discharge through the alternator. A capacitor (condenser) mounted on end housing protects diode plate assembly from high voltages and suppresses radio noises.

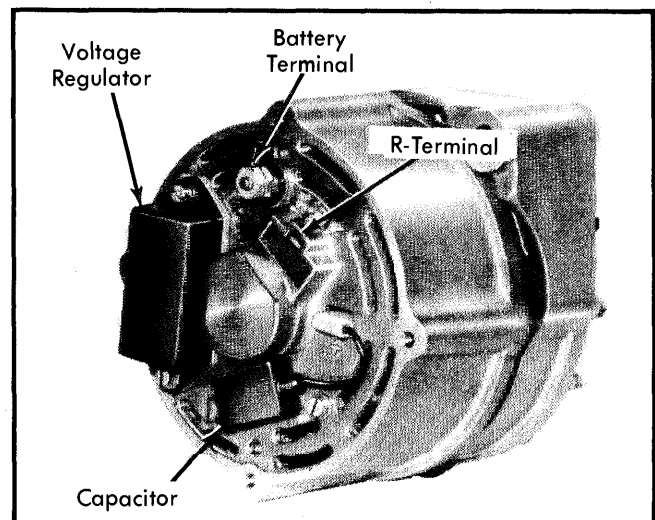
Battery charging is accomplished by current being directly supplied from the alternator output terminal to the battery, using the starter solenoid as a junction point. The battery positive cable joins the alternator's heavy gauge red wire at the

solenoid. The alternator is grounded to the engine to complete the circuit to the negative battery cable.

The amount of charge received by the battery depends upon its state of charge and internal condition, proper operation of the voltage regulator and amount of power being consumed by electrical loads such as heater blower motor, driving lamps, and rear window heater.

#### ADJUSTMENTS

No periodic adjustments or maintenance of any kind is required on entire alternator assembly. Voltage regulator is factory preset and no service or adjustment is possible.



**Fig. 2 Identification of Rear Housing External Components and Terminal Locations**

#### TESTING

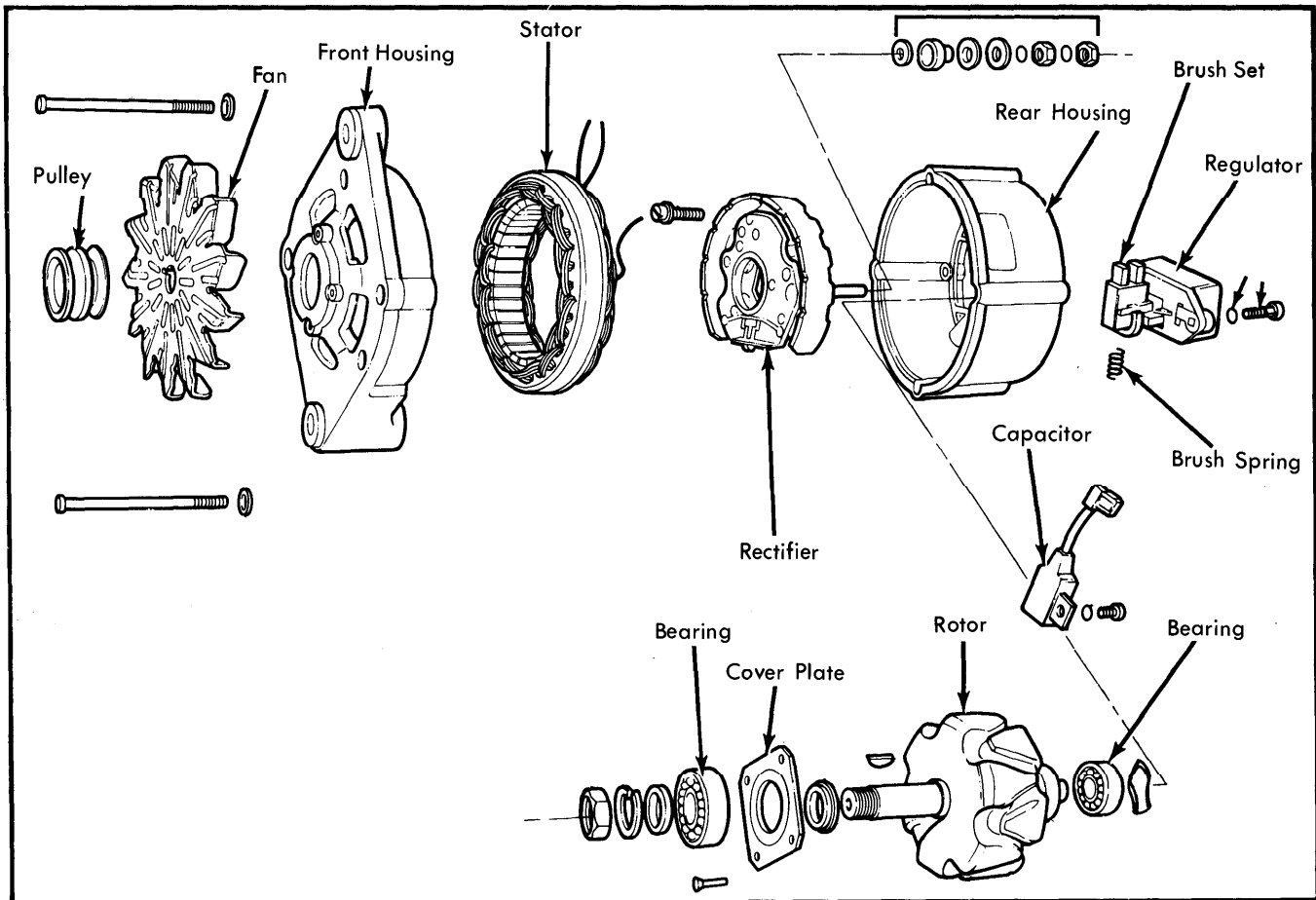
##### UNDERCHARGED BATTERY

1) Check alternator belt tension. Make sure all accessories are off. Check for sources of possible battery drain. With battery cables connected, connect jumper wire from coil negative wire to ground. Connect voltmeter to positive terminal of alternator and to ground. Crank engine and read voltage.

2) If reading is above 9 volts, proceed to step 3). If reading is less than 9 volts, check battery voltage while cranking. If reading is not within .5 volts of alternator test in step 1), check for battery-to-alternator circuit resistance. If reading is within .5 volts of alternator voltage, test battery using load test procedure. If not okay, replace battery. If okay proceed to step 3).

3) Disconnect jumper wire at coil and connect voltmeter across battery. Record the reading. Then place carburetor on high step of fast idle cam. Start engine, but do not touch accelerator. Turn on high beam of headlights, air conditioning, radio and blower-type defogger. Again check battery voltage. If voltage is now lower, proceed to step 4). If voltage is higher than previous reading, turn off all accessories and wait until upper radiator inlet is hot and voltmeter stabilizes. Check battery voltage again. If meter reads under 12.5 volts, proceed to

## BOSCH (Cont.)



**Fig. 3 Exploded View of Bosch Type K1 Alternator**

step 4). If meter reads over 15.5 volts, replace voltage regulator. If meter reads 12-15.5 volts, undercharged condition may be caused by excessive idling, slow or short distance driving, or excessive use of accessories.

4) Ground alternator by touching screwdriver to tab and alternator body. Check battery voltage. If voltage is higher than first reading in step 3), replace voltage regulator. If voltage is lower, overhaul alternator.

### OVERCHARGED BATTERY

1) Perform battery heavy load test. Replace battery if necessary. Connect voltmeter across battery, place carburetor on high step of fast idle cam and start engine but do not touch accelerator pedal.

2) Turn off all accessories and wait for radiator upper inlet to become hot and voltmeter reading to stabilize. Check voltage again. If reading is other than 12.0-15.5 volts, replace voltage regulator.

3) Check for shorted field windings in alternator, as possible cause of regulator failure. If shorted, replace rotor.

### ALTERNATOR LEAKAGE

1) If alternator is suspected of discharging battery due to excessive leakage, test with a bulb socket with jumper wires and

a No. 158 bulb. Disconnect battery negative cable at battery. Disconnect alternator output wire at starter solenoid junction terminal.

2) Connect jumper wires in series with battery positive cable. Connect battery negative cable. Bulb should not light. If bulb lights even dimly, replace diode plate assembly.

3) Disconnect battery negative cable. Remove jumper wires. Disconnect connector from "R" terminal of alternator. Connect jumper wires in series with "R" terminal at alternator and battery positive cable. Bulb should not light. If bulb lights even dimly, test diode plate assembly. If not defective, replace voltage regulator.

4) Disconnect battery negative cable, remove jumper wires and reconnect "R" terminal connector to alternator. Connect negative battery cable.

### OVERHAUL

#### DISASSEMBLY

1) Scribe marks on front and rear housing for assembly reference. Remove regulator/brush holder retaining screws, tip regulator assembly and remove from rear housing. Unplug condenser wire. Remove retaining screw, washer and condenser. Remove through bolts from front and rear housing.

# Alternators & Regulators

## BOSCH (Cont.)

2) Separate front housing and rotor assembly from stator and rear housing. Place a piece of tape over rear housing bearing to prevent dirt from entering bearing. Also place tape over rotor shaft on slip ring end. Remove wave washer from rear housings.

3) Remove nuts and washers from battery terminal stud, noting relationship of parts for later reassembly. Place rotor in vise and tighten only enough to permit loosening of shaft nut.

4) Remove shaft nut, lock washer, pulley, key and fan. Remove bearing retainer screws from front housing and remove rotor assembly. Remove stator and diode plate assembly from rear housing. Unsolder stator leads from diode plate assembly, avoiding excessive heat.

**NOTE** — Bend phase lead-out wires as little as possible to avoid damaging wires.

5) Separate drive housing from rotor shaft. Press rear bearing from rotor shaft and then the front bearing.

### INSPECTION

1) Clean poles of rotor with oleum spirits.

**NOTE** — Do not clean with degreasing solvent.

2) Clean slip rings with solvent and check for roughness. Polish with commutator paper. If necessary, true out-of-round slip ring in lathe to .002" maximum indicator reading.

3) Clean stator, brushing with oleum spirits. Inspect brushes for wear or contamination and clean thoroughly with a soft dry cloth until free of residue.

4) Replace the rear rotor shaft bearing if its lubricant supply is exhausted. Do not attempt to lubricate or reuse a dry bearing.

### BENCH TESTING

**Rotor Short-to-Ground** — Use an ohmmeter set to the 1000 scale or a 110 volt test lamp. Hold one lead to rotor shaft and touch other lead to one slip ring. Repeat with other slip ring. Ohmmeter should indicate infinity (no needle movement) or test lamp should not light. If ohmmeter indicates any reading or lamp lights, a short-to-ground exists. Check for excess solder, replace rotor if damaged.

**Rotor Open** — Use an ohmmeter set to the 1 scale or a 110 volt test lamp. Touch one test lead to one slip ring and other test lead to other slip ring. Ohmmeter should indicate 3.0-3.7 ohms or test lamp should light. Any variance indicates rotor winding is open.

**Rotor Internal Short** — Use a 12 volt battery and an ammeter. Connect battery and ammeter in series with slip rings. The field current at 12 volts and 80°F temperature should be 3.5-5.0 amps. Ammeter reading above 5.0 amps indicates shorted rotor windings, below 3.5 amps indicates excessive resistance.

**Stator Short-to-Ground** — Using a 110 volt test lamp or an ohmmeter set to the 1000 scale, connect one lead to any stator

lead and the other lead to stator core. If test lamp lights or if resistance is other than infinity, windings are grounded and must be replaced.

**Stator Continuity** — Use an ohmmeter set to the 1 scale and touch leads to 2 stator leads and note reading. Test all stator leads in this manner. Equal readings should be obtained for each pair. Infinite resistance indicates open windings. Check neutral junction splice for poor solder connection. Resolder connection even if it appears okay. Retest and if open still exists, replace stator. If resistance of more than 1 ohm is found, a bad solder joint is likely.

**Diodes** — Unsolder stator windings, avoiding excessive heat. Check diodes for foreign material, cleaning in Benzine if necessary. Place ohmmeter test probes on heat sink and diode junctions individually. Each combination of terminals tested should give one high reading and one low reading. If not observed for all diodes, replace diode plate assembly.

**Stator Internal Short Circuit** — If all other electrical checks are normal and alternator fails to supply its rated output, suspect shorted stator windings.

### REASSEMBLY

1) Fill cavity between retainer plate and bearing ¼ full with Bosch lubricant No. Ft1v34.

**NOTE** — Do not overfill as this may cause bearing to overheat.

2) Install front bearing and then rear bearing on rotor shaft. Assemble rotor into front housing.

3) Solder stator leads to diode plate assembly, avoiding excessive heat. Install stator assembly to rear housing.

4) Remove tape previously installed and assemble front and rear housings. Align scribe marks and install through bolts and tighten. Install shaft key, fan, pulley, washers and nut. Place rotor in vise and tighten shaft nut.

5) Install nuts and washer on battery terminal in original position. Install condenser, voltage regulator and brush assembly to rear of housing. Plug in condenser wire. Install alternator and drive belt.

Alternator/Regulator Specifications	
Application	Specification
Alternator Output	65 amps. @14 volts
Alternator Field Current	3.5-5.0 amps. @80° F
Alternator Rotation	
Viewed From Drive End	Clockwise
Regulator Voltage	
At 0-50° F	14.5-15.1 volts
At 50-100° F	14.1-14.7 volts
At 100-150° F	13.4-14.4 volts
At 150° F	13.2-14.0 volts